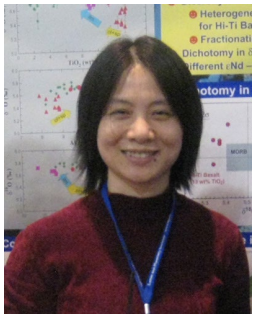
Curriculum Vitae



Yang LIU
Research Scientist

Jet Propulsion Laboratory
California Institute of Technology
4800 Oak Grove Dr., M/S: 183-301
Pasadena, CA 91109
Tel: 626-437-6532
Email: yang.liu@jpl.nasa.gov
Webpage: http://science.jpl.nasa.gov/people/YLiu3

Education

The University of Michigan
Ph.D. Geology, April 2003
M.S., Geology, December 1998

Chengdu University of Technology
B.S., Petroleum, July 1995

Position Held

NASA Jet Propulsion Laboratory, California Institute of Technology
Research Scientist, Nov. 2012-present
Division Safety Representative, Oct. 2019-present
Group supervisor, Feb. 2022-present

California Institute of Technology
Visiting Associate, Division of Geophysics and Planetary Geosciences, *Nov. 2012-present*

California Institute of Technology
Lecturer, Division of Geophysics and Planetary Geosciences, *Spring, 2013-2015*

University of Tennessee
Research Assistant Professor, Jan. 2010-Oct. 2012

University of Tennessee
Post-Doctoral Researcher, May 2005-Dec. 2009
Planetary Geosciences Institute, Department of Earth and Planetary Sciences (with Lawrence A. Taylor)

University of Chicago
Post-Doctoral Researcher, *Jan. 2003-April 2005*
Department of Geophysical Sciences (with Alfred T. Anderson)

Mission Involvement

Mars 2020

Investigation Scientist, 2014-2020, *the Planetary Instrument for X-ray Lithology (PIXL)*
Appointed after the selection of the instrument and participated in reviews of all key decision points (preliminary design review, critical design review, and instrument delivery review. Gained the first-hand experience in requirement writing and associated and verification and validation. Led the development of the flight calibration target, and main contributor to the definition of verification and validation for elemental calibration and key scientific functionalities.

Mars Return Sample Planning Experience

MSR Science Planning Group

MRSH Implementation Planning Scientist, 2019

Based on the iMOST recommended science investigations, developed a matrix to evaluate science investigations that need to be performed in containment, which formed the basis for assessing scientific measurements and implementation strategies

Participated in discussion regarding contamination control in returned sample handling

Re-evaluated sample mass estimates for measurements

Contributed to the planning of two successful workshops relating to science in containment and contamination control, writing the reports, and the Mars return sample management plan

Conducted exercise to evaluate implementation strategies of recommended measurements in sample returning facility

MSR Sample Quality Requirements

Sample scientist, 2012-2014

Developed a matrix to evaluate required sample qualities (integrity, inorganic contamination, magnetic, temperature, radiation) in the measurements of returned samples

Supported a working group in drafting recommendations of sample quality requirements for overall Mars return sample missions

Co-organized workshop at the 2014 LPSC and presented working group findings at GSA, MEPAG, and 8th iMars conference which received positive feedback from the scientific community

The final recommendations of sample quality requirements were adapted for Mars 2020 sample caching system

Assessed effects of individual missions on sample quality and workflow of samples in a sample return facility

Research Experience

- *Expertise*: Mineralogy, petrology, petrography, stable isotope, and trace element geochemistry
- *Planetary samples*: More than 15 years' experience working with small, precious Apollo samples and meteorite samples that require special handling and processing considerations to minimize terrestrial contamination
- *Microbeam techniques on polished samples:* Proficient in microbeam techniques including scanning electron microscopy (SEM), electron probe micro-analyzer (EPMA), Secondary Ion Mass Spectrometry (SIMS), Micro-XRF, IR/Raman spectroscopy, laser ablation inductively-coupled plasma mass spectrometry (LA-ICP-MS). Specifically, established SIMS procedure for D/H analysis of Apollo and martian samples that minimize terrestrial contamination
- *Other analytical techniques*: In-depth knowledge of micro-XRF, powder X-ray diffraction (XRD), CT scans. Familiarity with the transmission electron microscope (TEM) for nano-scale imaging and synchrotron X-ray absorption
- *Experimental Apparatus:* Setup and calibration of a rapid-quench cold-seal pressure vessel, involving high-pressure gas system; frequent use of cold-seal vessels and internally heated pressure vessels.

Leadership and Services

NASA:	Panelist and reviewer for multiple NASA ROSES and CAN programs, & Judge for NASA Centennial Challenge (Sample Return Robot)
Guest Editor:	Geochimica et Cosmochimica Acta
Editor:	Minerals
Journal Reviewers:	Annals of Geophysics, American Mineralogist, Bulletin of Volcanology, Chemical Geology, Contributions to Mineralogy and Petrology, Geochimica et Cosmochimica Acta, Geology, Icarus, International Geology Review, Journal of

	Geology, JGR, Journal of Volcanology and Geothermal Research, Meteoritics & Planetary Science, Minerals, Planetary and Space Science, X-ray spectrometry.
Conveners:	Southeastern GSA 2006; Western Pacific Geophysics Meeting 2006, Goldschmidt 2010, 2014; GSA 2013.
Program Committee:	8th International Mars conference

Professional Association

Mineralogical Society of America, Geological Society of America, The Meteoritical Society, American Geophysical Union,

Awards and Honor

2021, 2020, 2016	Voyager Awards, JPL
2020	Mars 2020 surface operation and PIXL bonus Awards
2020	NPR interview
2017	Discovery Channel Film on Volcanoes in the Solar System
2016	JPL NASA profile interview
2016	Mars Exploration Science Support Team Award, JPL
2016	PIXL Instrument Team Award
2014	Mariner Award, JPL
1998-2001	Three Turner Awards, Dept. of Geological Sci., Univ. of Michigan, Ann Arbor, MI
1992-1994	Excellent Academic Achievement Award, Chengdu University of Technology

Invited Talks

- University of Nevada, Las Vegas, September, 2021
- University of Arizona, Oct 2020
- University of Michigan, Earth and Environmental Sciences, Smith Lecture, September, 2019
- Geological Society of America, Seattle, WA, "T198. Apatite As a Versatile Tool for Enabling Planetary Science", Oct 22-25, 2017
- Geological Society of America, Boulder, Colorado, "Volatiles & Magma Ascent Rates", Oct., 2014
- University of California, San Diego: "Some New Constraints on Martian Meteorites", Oct., 2013
- Caltech: "Water on the Moon", Feb., 2013
- Goldschmidt 2012: "Water , Water, Everywhere on the Moon", June 2012
- Geological Society of America, Boulder, Colorado, "Volatiles & Magma Ascent Rates", Nov. 2010
- East Tennessee Geological Society, Knoxville, "Water on the Moon", Nov. 2010
- Tennessee Technology Society, Knoxville, "Water on the Moon", Oct. 2010
- University of Tennessee, Knoxville, Earth & Planetary Science Department, "Water on the Moon", Sept. 2010
- University of Tennessee, Knoxville, Earth & Planetary Science Department, "Volatiles in Silicate Melts and Volcanic Eruptions", Jan. 2007

Outreach

- 2019 Speaker at the Project Scientist Academy (K-12)
- 2019 Speaker at the Chinese Parents Booster Club, Arcadia High School
- 2018 Support the Science and Engineering Booth at the STEAM Fair at Arcadia High School
- 2017 Led hiking event for Knox Presbyterian
- 2013 Volunteer, Door of Hope

New Minerals

1) Ma, C., **Liu, Y.**, and Tschauner, O. (2013). Tissintite. *IMA 2013-027. CNMNC Newsletter No. 16, Aug. 2013, Page 2707; Mineralogical Magazine, 77, 2695-2709.*
2) Tschauner, O., Ma, C., and **Liu, Y**. (2013). Ahrensite. *IMA 2013-028. CNMNC Newsletter No. 16, Aug. 2013, Page 2707; Mineralogical Magazine, 77, 2695-2709.*

New Meteorite Classified

1) **Liu, Y. (2016)** NWA 10553, brecciated eucrite, *Meteorite Bulletin, 105.*
2) **Liu, Y. (2016)** NWA 10554, eucrite, *Meteorite Bulletin, 105.*
3) **Liu, Y. (2020)** NWA 13134, shergottite, *Meteorite Bulletin, 109.*
4) **Liu, Y. (2021)** NWA 13638, lunar breccia, *Meteorite Bulletin, 110.*

Teaching Experience

Lecturer, Spring of 2013-2015, *Caltech*
GS115c-Petrography of Igneous and Metamorphic Rock: a lab-based course for undergraduate students.

Instructor, Spring, 2006, 2010, 2011, *University of Tennessee*
GS460-Principles of Geochemistry: Developed syllabus and course materials for a senior-graduate level course with 9 students.
GS630-Phase Equilibria: Discussion-type graduate courses on silicate phase diagrams with 5-6 students.

Guest Lecturer, Winter, 2007, 2009, *University of Tennessee*,
GS103-Earth and Environment: 1.5-hour lecture on volcanic hazards to ~100 students.

Graduate Teaching Assistant, Winter, 2001, 2002, *University of Michigan*
GS 410-Earth Materials: Routine lectures on course topics; Design of the curriculum, experiments, and exams for the lab section.

Other Teaching-Associated Activities, *1998, 1999, 2000, University of Michigan,*
Participant in teaching workshops for international and graduate students. Lab assistant teaching users of a Cameca MBX electron microprobe and a Hitachi scanning electron microscope.

Mentoring Experience

Jet Propulsion Lab, Caltech 2013-present Supervisor
Postdocs: David Burney (2021-present), Yang Chen (2013-2015), Jinping Hu (2015-2016)
Summer interns: Richard Kim, USC (2015); Barry Chew (2014)

California Institute of Technology 2014-2015 Co-Mentor
Undergraduate: Jen Caseres Senior Thesis, results presented at MetSoc 2015.

University of Tennessee, Knoxville, TN 2007-2012 Co-supervisor
Postdocs: Amit Basu Sarbadhikari, Amy VJ Riches, Ioannis Baziotis.
Projects of Master students: Darren Schnare and Mike Mellin

University of Michigan, Ann Arbor, MI 1998
Supervisor of an undergraduate student (J Sohn) in his summer research project

Publications

Reports

1) MSPG (MSR Science Planning Group: co-chairs M. Meyer and E. Sefton-Nash; facilitation D. W. Beaty and B. L. Carrier; and D. Bass, F. Gaubert, T. Haltigin, A. D. Harrington, M. M. Grady, **Y. Liu,** D. Martin, B. Marty, R. Mattingly, S. Siljestrom, E. Stansbery, K. Tait, M. Wadhwa, L. White) & C. C. Allen, H. Busemann, M. Calaway, M. Chaussidon, C. M. Corrigan, N. Dauphas, V. Debaille, D. P. Glavin, S. M. McLennan, K.Olsson-Francis, R. Shaheen, C. L. Smith, J. Thieme, T. Usui, M. A. Velbel, S. C. Werner (2019) The Relationship of MSR Science

and Containment. Unpublished workshop report, posted 04/01/19 at https://mepag.jpl.nasa.gov/reports/Science%20in%20Containment%20Report.pdf

2) MSPG (MSR Science Planning Group: co-chairs M. Meyer and E. Sefton-Nash; facilitation D. W. Beaty and B. L. Carrier; and D. Bass, F. Gaubert, M. M. Grady, T. Haltigin, A. D. Harrington, **Y. Liu,** D. Martin, B. Marty, R. Mattingly, S. Siljeström, E. Stansbery, K. Tait, M. Wadhwa, L. White), & A. M. B. Anesio, L. Bonal, A. Bouvier, J. C. Bridges, J. R. Brucato, K. L. French, U. Gommel, H. V. Graham, J. M. C. Holt, G. Kreck, R. Mackelprang, F. M. McCubbin, K. Olsson-Francis, A. B. Regberg, A. Saverino, M. A. Sephton, & C. K. Sio (2019) Science-Driven Contamination Control Issues Associated with the Receiving and Initial Processing of the MSR Samples. Unpublished workshop report, posted 09/20/19 at https://mepag.jpl.nasa.gov/reports.cfm.
3) MSPG (MSR Science Planning Group: co-chairs M. Meyer and E. Sefton-Nash; facilitation D. W. Beaty and B. L. Carrier; and D. Bass, F. Gaubert, M. M. Grady, T. Haltigin, Y. Liu, D. Martin, B. Marty, R. Mattingly, S. Siljeström, E. Stansbery, K. Tait, M. Wadhwa, L. White), 2019, A Framework for Mars Returned Sample Science Management. Unpublished white paper, posted 12/11/19 at https://mepag.jpl.nasa.gov/reports.cfm?expand=mspg.
4) MSPG (MSR Science Planning Group: co-chairs M. Meyer and E. Sefton-Nash; facilitation D. W. Beaty and B. L. Carrier; and D. Bass, F. Gaubert, M. M. Grady, T. Haltigin, Y. Liu, D. Martin, B. Marty, R. Mattingly, S. Siljeström, E. Stansbery, K. Tait, M. Wadhwa, L. White), 2019, Summary of the 2019 Work of the MSR Science Planning Group (MSPG), posted 12/2/2019 at https://mepag.jpl.nasa.gov/reports.cfm.
5) Velazco, JE, Taylor, M, Liu, Y, Hodyss, R, Allwood, A 2016. A Novel Rotating-Wave X-Ray Source for Analysis of the Martian Landscape. The Interplanetary Network Progress Report, 207, 1-12.
6) Hyanes, P., Ingersoll, A.P., Paige, D.A., et al. (2014) New approaches to lunar ice detection and mapping. KISS report.
7) Eiler, J; Blacksberg, J.; et al. (2013) In situ science and instrumentation for primitive bodies. KISS report.

Conference Papers

1) Strahle, J.W., Mock, S., Mattingly, R., Younse, P., Chesin, J., Kim, T., Mayo, J., Lengtat, C., Liu, Y. 2021. Sample return container opening process concept for potential Mars sample return. *IEEE Aerospace Conference* (50100), 1-19.
2) Fraeman AA, Ehlmann B.L., Northwood-Smith G.W.D., **Liu Y.**, Wadhwa M., Greenberger R.N. (2016) Using VSWIR microimaging spectroscopy to exploring the mineralogical diversity of HED meteorites. In: *8th Workshop on Hyperspectral Image and Signal Processing: Evolution in Remote Sensing (WHISPERS 2016)*, 21-24 August 2016, Los Angeles, CA.
3) **Liu, Y.,** and Taylor, L.A., 2010. Troublesome lunar dust: Knowns and unknowns for mitigation. In Global Lunar Conference, GLUC-2010.2.8.A.2, Beijing, China. 15 pages.
4) Taylor, L.A., and **Liu, Y.**, 2010. Important considerations for lunar soil simulants. *12th Biennial ASCE Aerospace Division International Conference.* 15 pages.
5) Cole, D.M., Taylor, L.A., **Liu**, **Y.,** and Hopkins, M.A., 2010. Grain-scale mechanical properties of lunar plagioclase and its simulant: Initial experimental findings and modeling implications. *12th Biennial ASCE Aerospace Division International Conference.* 15 pages.
6) **Liu, Y.**, Taylor, L.A., Basu Sarbadhikari, A., Valley, J., et al. 2008c. Diamond genesis in the world's largest diamondiferous eclogite, part II: In-situ isotopes study of diamond and mineral inclusions. *9th International Kimberlite Conference, Abstract 00188*. 3 pages.
7) Taylor, L.A., **Liu**, **Y.**, Basu Sarbadhikari, A., Ketchum, R., Carlson, W., et al. 2008. Diamond genesis in the world's largest diamondiferous eclogite, part I: X-ray tomography and xenolith dissection. *9th International Kimberlite Conference, Abstract 00186*. 3 pages.
8) **Liu**, **Y**., Park, J., Hill, E., Kihm, K.D., Taylor, L.A., 2006b. Morphology and physical characteristics of Apollo 17 dust particles. *10th ASCE Aerospace Division International Conference,* 15 pages.
9) Hill, E., Patchen, A.D., Deane, B., **Liu**, **Y.**, Park, J., and Taylor, L.A., 2006. Lunar simulants as feedstocks for ISRU processing: mineralogy and chemistry. *10th ASCE Aerospace Division International Conference,* 15 pages.
10) Park, J.S., **Liu**, **Y.,** Kihm, K.D., Hill, E., and Taylor, L.A., 2006. Submicron particle size distribution of Apollo 11 lunar dust. *10th ASCE Aerospace Division International Conference*, Houston, 15 pages.
11) Taylor, L.A., Hill, E., **Liu**, **Y.,** Park, J.S., and Bruce, R.W. 2006. Microwave processing Apollo soil: products for a lunar base. *10th ASCE Aerospace Division International Conference*, Houston, 15 pages.

Book Chapter

Williams, D.A., Byrne, P.K., Jozwiakd, L., **Liu, Y.**, Radebaugh, J., 2021. Effusive silicate volcanism: Observations and processes, in: Byrne, P.K., Lopes, R.M.C., Siegler, M.A. (Eds.), Planetary Volcanism across the Solar System. Elsevier.

Peer-Reviewed Articles (*Post-doc, Google scholar h-index = 37, i10-index = 63)

1. Hu, J., Asimow, P.D., **Liu, Y.**, Ma, C., **2023**. Low-pressure ejection of shergottites from Mars. ***Science Advances*** (*in revision*).
2. Su, X., Zhang, Y.X., **Liu, Y.**, Holder, R. 2023. Outgassing and in-gassing of Na and Cu in lunar 74220 orange glass beads. *Earth and Planetary Science Letters* ***602,*** 10.1016/j.epsl.2022.117924.
3. Henneke, J., Pedersen, D.K.A., **Liu, Y.,** et al. 2022. Multispectral performance of PIXL's micro context camera and flood light illuminator. *Space Science Review* (submitted).
4. Beyssac, O. et al. 2022. Petrological traverse of the olivine cumulate formation on the floor of Jezero Crater, Mars: a perspective from SuperCam onboard Perseverance. *JGR-planet* (submitted).
5. Casademont, T.M. et al. 2022. RIMFAX ground penetrating radar reveals dielectric permittivity and rock density of shallow Martian subsurface. *JGR-planet* (submitted).
6. Horgan, B. et al. 2022. Mineralogy, morphology, and emplacement history of the Maaz formation on the Jezero crater floor from orbital and rover observations. *JGR-planet* (submitted).
7. Sharma, S. et al. 2022. Mapping organic molecules in Jezero crater using Raman and fluorescence spectroscopy. ***Nature*** (revised).
8. Sun, V. et al. 2022. Exploring the Jezero crater floor: Overview and results from the Mars 2020 Perseverance Rover's first science campaign on the Jezero crater floor. *JGR-planet* (submitted).
9. **Liu, Y.** and Ma, C. **2022**. Direct evidence of volcanic outgassing of Na and K on the Moon from Apollo orange beads. *Icarus* **382***,* https://doi.org/10.1016/j.icarus.2022.115044.
10. **Liu, Y.** et al. 2022. An olivine cumulate outcrop on the floor of Jezero crater, Mars. ***Science*** **377**, 1513-1519.
11. Farley, K. et al. 2022. Aqueously altered igneous rocks on the floor of Jezero crater, Mar. ***Science*** **377** (6614), eabo2196, 10.1126/science.abo2196.
12. Hollis, J.R., et al. 2022. The power of paired proximity science observations: Co-located data from SHERLOC and PIXL on Mars. *Icarus* **387**, 115179.
13. Scheller, E.L. et al. 2022. Aqueous alteration processes and implications for organic geochemistry in Jezero crater, Mars. ***Science*** **378**, 10.1126/science.abo5204.
14. Shkolyar, S., Jaret, S. J., Cohen, B. A., Johnson, J. R., Ollila, A., Beyssac, O., Wiens, R., **Liu, Y.,** Holm-Alwmark, S. 2021. Identifying shocked feldspar on Mars using Perseverance spectroscopic instruments: Implications for geochronology studies on returned samples. *Earth, Moon, and Planets* **126,** 4, https://doi.org/10.1007/s11038-022-09546-6.
15. Tice, M. et al. 2022. Alteration History of Séítah Formation Rocks Inferred by PIXL X-ray Fluorescence, X-ray 3 Diffraction, and Multispectral Imaging on Mar**s. *Science Advances* 8**, 10.1126/sciadv.abp9084).
16. Udry, A., et al. 2022. A Mars 2020 Perseverance SuperCam Perspective on the Igneous Nature of the Máaz formation at Jezero crater and link with Séítah, Mars. *JGR-planet*, 10.1029/2022JE007440.
17. **Liu, Y.**, Fischer, W.W., Ma, C., Beckett, J.R., Tschauner, O., Guan, Y., Lingappa, U.F., Webb, S.M., Prakapenka, V.B., Lanza, N.L., Agee, C.B. **2021**. Manganese oxides in Martian meteorites Northwest Africa (NWA) 7034 and 7533. *Icarus* **364**, https://doi.org/10.1016/j.icarus.2021.114471.
18. Masiero, R.J., Davidsson, B.J.R., Liu, Y., Moore, K., Tuite, M. 2021. Volatility of sodium in carbonaceous chondrites at temperatures consistent with low-perihelia asteroids. *Planetary Science Journal* **2**, 165-178.
19. McCubbin, F.M., et al. 2021. Endogenous lunar volatiles. Reviews in Mineralogy and Geochemistry (New views of the Moon-2) (in press). (YL as chapter lead)

20. Nicklas, R.W., Day, J.M.D., Vaci, Z., Udry, A., **Liu, Y.**, Tait, K.T. 2021. Uniform oxygen fugacity of shergottite mantle sources and an oxidized martian lithosphere. *Earth and Planetary Science Letters,* **564**, 1-10.
21. Allwood, A.C., Wade L.A., Foote, M.C., et al. **2020**. PIXL: Planetary Instrument for X-ray Lithochemistry. *Space Science Reviews* **216**, 314, DOI: 10.1007/s11214-020-00767-7.
22. Farley, K., Williford, K., Stack, K.M., et al. 2020. Mars 2020 Mission Overview. *Space Science Reviews* **216**, 142, DOI: 10.1007/s11214-020-00762-y.
23. Stack, K.M., Calef III, F., Williams, N.R., et al. 2020. Photogeologic map of the Perseverance rover field site in Jezero Crater constructed by the Mars 2020 science team. *Space Science Reviews* **216**, 127, DOI: 10.1007/s11214-020-00739-x.
24. McIntosh, E.C., Day, J.M.D., **Liu, Y.**, et al. 2020. Examining the compositions of impactors striking the Moon using Apollo impact melt coats and anorthositic regolith breccia meteorites. *Geochim. Cosmochim. Acta* **274**, 192-210.
25. Ma, C., **Liu, Y**. **2019**. Discovery of a zinc-rich mineral on the surface of lunar orange pyroclastic beads. *American Mineralogist* **104**, 447-452.
26. Carrier, B.L., Abbey, W.J., Beegle, L.W., Bhartia, R., **Liu, Y.** 2019. Attenuation of ultraviolet radiation in rocks & minerals: Implications for Mars science. *JGR-Planet*, DOI: 10.1029/2018JE005758.
27. Ma, C., Tschauner, O., Beckett, J. R., **Liu, Y**. 2019. Chenmingite, $FeCr_2O_4$ in the $CaFe_2O_4$-type structure, a shock-induced, high-pressure mineral in the Tissint martian meteorite. *American Mineralogist* **104**, 1521-1525.
28. **Liu, Y.**, Chen Y., Guan Y., Eiler, J.M., Ma C., Rossman, G.R., Zhang, Y. **2018**. Impact-melt hygrometer for Mars: The case of shergottite Elephant Moraine (EETA) 79001. *Earth & Planetary Science Letters*, **490**, 206-215.
29. Day, J.M.D., Tait, K.T., Udry, A., Moynier, F., **Liu, Y.**, and Neal, C.R. 2018. Martian magmatism from plume metasomatized mantle. ***Nature Communications*****, 9**, 4799.
30. Myers, M.L., Wallace, P.J., Wilson, C.J.N., Watkins, J.L., **Liu, Y**. 2018. Ascent rates of rhyolitic magma at the onset of three caldera-forming eruptions. *American Mineralogist*, **103**, 952-965.
31. Hui, H., Guan, Y., Chen, Y., Peslier, A. H. Zhang, Y., **Liu, Y.**, Flemming, R. L., Rossman, G. R., Eiler, J. M., Neal, C. R., Osinski, G. R. **2017**. A heterogeneous lunar interior for hydrogen isotopes as revealed by lunar highlands samples. *Earth & Planetary Science Letters,* **473**, 14-23.
32. Kuchka, CR, Herd, C., Walton, E. L., Guan, Y., **Liu, Y.** 2017. Martian low-temperature alteration materials in shock-melt pockets in Tissint: Constraints on their preservation in shergottite meteorites. *Geochimica et Cosmochimica Acta*, **210**, 228-246.
33. **Liu, Y.,** Ma, C., Beckett, J., Chen, Y., Guan, Y. **2016a**. Rare-earth-element minerals in martian breccia meteorite NWA 7034 and 7533: Implications for fluid-rock interaction in the martian crust. *Earth & Planetary Science Letters,* **451**, 251-262.
34. **Liu, Y**., Baziotis, I.P., Asimow, P.D., Bodnar, R.J., Taylor, L.A., 2016b. Mineral chemistry of the Tissint meteorite: Indications of two-stage crystallization in a closed system. *Meteoritics & Planetary Science,* **51**, 2293-2315.
35. Howarth, G.H., **Liu, Y.**, Chen, Y., Pernet-Fisher, J.F., and Taylor, L.A. 2016. Postcrystallization metasomatism in shergottites: Evidence from the paired meteorites LAR 06319 and LAR 12011. *Meteoritics & Planetary Science,* **51***,* 2061-2072.
36. Ma, C., Tschauner, O., Beckett, J. R., **Liu, Y.**, Rossman, G. R., Stanislav, V., Sinogeikin, S., Smith, J., Taylor, L. A. 2016. Ahrensite, γ- Fe_2SiO_4, a new shock-metamorphic mineral from the Tissinte meteorite-implications for the Tissint shock event on Mars. *Geochimica et Cosmochimica Acta*, **184**, 240-256.
37. Taylor, L.A., **Liu, Y.**, Lofgren, G. 2016. Integrity of lunar soil samples. ***Nature Geoscience,*** **9**, 87-87.

38. Taylor L. A., Logvinova, A., Howarth, G.H., **Liu**, **Y**., Peslier, A., Guan, Y., Chen, Y., Sobolev, N.V. 2016. Low water contents in diamond mineral inclusions: Proto-genetic origin in a dry cratonic lithosphere. *Earth & Planetary Science Letters,* **433**, 125-132.
39. *Chen, Y., **Liu, Y.,** Guan, Y., Eiler, J., Ma, C., Rossman, G. R., Taylor, L. A. **2015a**. Evidence in Tissint for recent subsurface water on Mars. *Earth & Planetary Science Letters,* 425, 55-63.
40. *Chen, Y., Zhang, Y.-X., **Liu, Y.,** Guan, Y., Eiler, J., Stolper, E.M. 2015b. Water, fluorine, and sulfur concentrations in the lunar mantle. *Earth & Planetary Science Letters,* **427**, 37-46.
41. Ma, C., Tschauner, O., Beckett, J. R., **Liu, Y.**, Rossman, G. R., Zuravlev, K., Prakapenka, V., Dera P., Sinogeikin, S., Taylor, L. A. 2015. Tissintite, $(Ca,Na,\square)AlSi_2O_6$, a highly defective shock-induced, high-pressure clinopyroxene in the Tissint Martian meteorite. *Earth & Planetary Science Letters*, **422**, 194-205.
42. McCubbin, F. M., Vander Kaaden, K. E., Tartese, R., Klima, R.L., **Liu, Y.**, and 9 more authors. 2015. Volatiles (H, C, N, F, S, Cl) in the lunar mantle, crust, and regolith: Distribution, processes, sources, and significance. *Am. Min.*, Invited Review **100**, 1668-1707.
43. Thompson, D.R., 9 authors, Liu, Y., Wade, L.A. 2015. Automating X-ray fluorescence analysis for rapid astrobiology surveys. *Astrobiology,* **15**, 961-976.
44. *Pernet-Fisher, J.F., Howarth, G.H., **Liu, Y.**, Barry, P.H., Taylor, L. A. **2014**. Estimating the lunar mantle water budget from phosphates: Complications associated with silicate-liquid-immiscibility. *Geochimica et Cosmochimica Acta,* **144**, 326-341.
45. *Pernet-Fisher, J.F., Howarth, G.H., **Liu, Y.**, Barry, P.H., Carmody, L., Valley, J.W., Bodnar, R.J., Spetsius, Z.V., and Taylor, L.A. 2014. Komsomolskaya diamondiferous eclogites: Evidence for oceanic crustal protoliths. *Contrib. Mineral. Petrol.*, **167**, 1-17.
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